

**PHOMI HOLDING CO., LTD.**

**eBIPV/eDisplay/eCovering  
Curtain Wall Engineering Design and  
Installation Guide**

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# 1 General Provisions

**1.0.1** This guide is formulated to ensure the safety, reliability, practicality, aesthetics, and economic feasibility of eBIPV, eDisplay, and eCovering composite panel curtain wall projects.

**1.0.2** This guide applies to the design, production, installation, construction and acceptance of the following civil building that use eBIPV/eDisplay/eCovering composite panels for curtain walls (hereinafter referred to as "curtain walls"):

The curtain walls are readily suitable for civil buildings with a height not exceeding 100 meters and a seismic fortification intensity not exceeding 8 degrees. When the building height exceeds 100 meters, expert evaluation is required.

**1.0.3** Quality control must be implemented throughout the entire process of design, production, and installation of eBIPV/eDisplay/eCovering composite panels for curtain walls. Companies involved in any part of the process should establish internal quality control standards.

**1.0.4** In addition to the requirements of this guide, the materials, design, production, installation, construction and acceptance of the eBIPV/eDisplay/eCovering shall also comply with the provisions of the relevant national mandatory standards.

## 2 Terminology

### 2.0.1 Building curtain walls

The building envelope structure is composed of metal frames and plates and does not bear the load and functions of the main structure.

### 2.0.2 econiclay, aka zero carbon surface material

It is made of modified clay materials as the main raw material, with the addition of high molecular polymers, and is made through molding, cross-linking, heating and compounding. It can mimic the appearance of various materials such as brick, wood, stone, leather, ceramics, woven fabrics, and reliefs. It has a thickness of 2-10mm and is a flexible, recyclable and lightweight decorative sheet.

### 2.0.3 econiclay Covering (eCovering) composite panels

A composite panel formed by bonding eCoverings with aluminum honeycomb panels, metal-folded veneers (such as aluminum veneers) or metal-faced rockwool sandwich panels.

### 2.0.4 econiclay BIPV (eBIPV) composite panels

A composite panel formed by bonding aluminum honeycomb panels, metal-folded veneers (such as aluminum veneers) or metal-faced rockwool sandwich panels with econiclay materials that can convert sunlight to electricity (solar power generation).

### 2.0.5 econiclay Display (eDisplay) composite panels

A composite panel formed by bonding aluminum honeycomb panels, metal-folded veneers (such as aluminum veneers) or metal-faced rockwool sandwich panels with econiclay materials that can either provide illumination, or display images and motion pictures (photoelectric display).

### 2.0.6 eCovering curtain walls

Building curtain walls made of eCovering composite panels. The basic structures of panels are shown in Figure 2.1, Figure 2.2 and Figure 2.3.

### 2.0.7 eBIPV curtain walls

Building curtain walls made of eBIPV composite panels. The basic structures of panels are shown in Figure 2.1, Figure 2.2 and Figure 2.3.

### 2.0.8 eDisplay curtain walls

Building curtain walls made of eDisplay composite panels. The basic structures of panels are shown in Figure 2.1, Figure 2.2 and Figure 2.3.

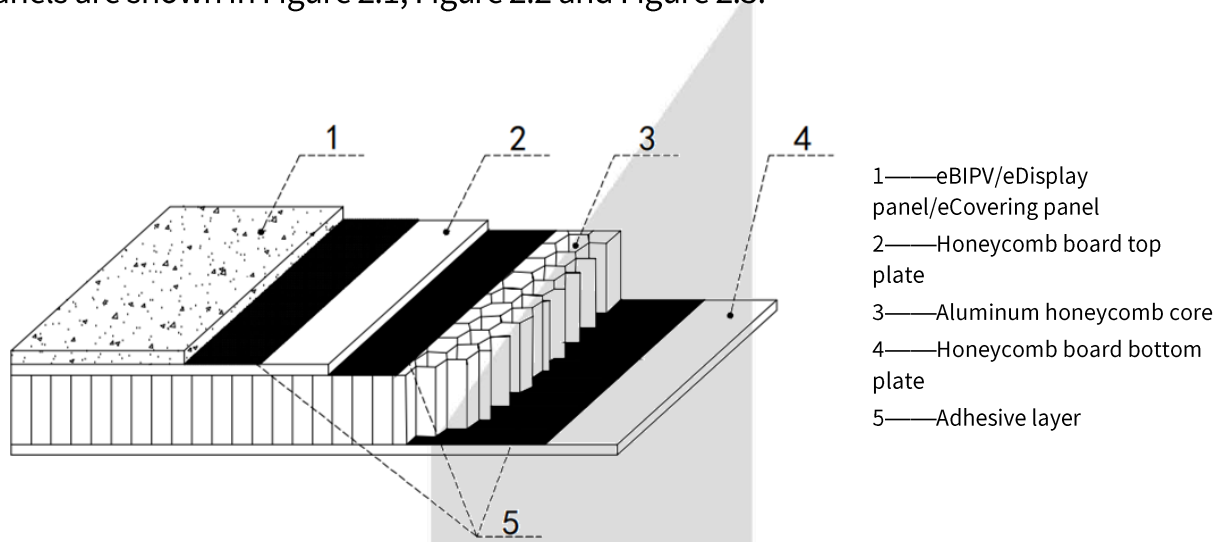


Figure 2.1 Schematic diagram of eBIPV/eDisplay/eCovering composite panel with aluminum honeycomb panel as the substrate

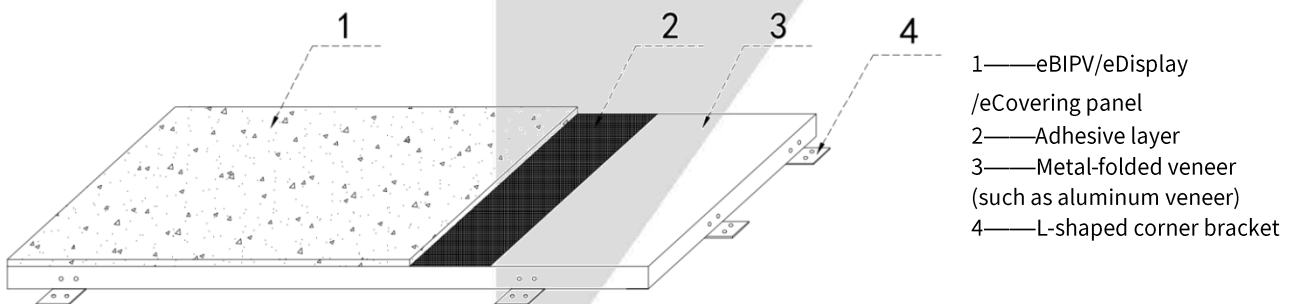


Figure 2.2 Schematic diagram of eBIPV/eDisplay/eCovering composite panel with metal-folded veneer (such as aluminum veneer) as the substrate

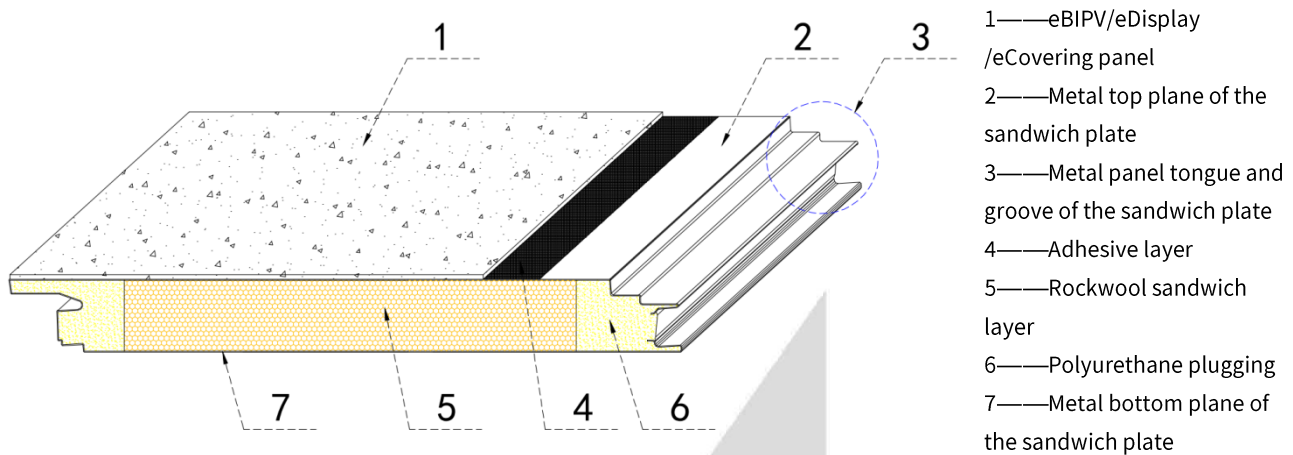


Figure 2.3 Schematic diagram of eBIPV/eDisplay/eCovering composite panel with metal-faced rockwool sandwich plate as the substrate

### 2.0.9 Combination curtain walls

The combination curtain walls are composed of different panels such as eBIPV, eDisplay, and eCovering composite panels.

### 2.0.10 Inclined building curtain wall

A building curtain wall that makes an angle greater than 75° but less than 90° with the horizontal plane.

### 2.0.11 Unitized building curtain walls

The unitized building curtain walls are composed of metal frames and various panels assembled into one-story buildings.

### 2.0.12 Small unit building curtain wall

A detachable building curtain wall consisting of a metal sub-frame, various single panels, and metal hooks connected to columns and beams.

### 2.0.13 Structural glazing sealant

Adhesive material used to bond various panels to each other and to metal frames for bearing stress in curtain walls.

#### **2.0.14 Weatherproofing silicone sealant**

Low modulus neutral silicone sealing material for curtain wall caulking and weatherproofing.

#### **2.0.15 Contact (Galvanic) corrosion**

Electrochemical corrosion occurs when two dissimilar metals come into contact.

#### **2.0.16 Compatibility**

The ability of the bonding/sealing materials to maintain their functionalities and remain unaffected without any physical or chemical changes when the bonding/sealing materials come into contact with other materials.

### 3 Structural design

#### 3.1 eBIPV/eDisplay/eCovering Composite Panels with Aluminum Honeycomb Panel as the Substrate

3.1.1 The installation diagram of the eBIPV/eDisplay/eCovering composite panels with aluminum honeycomb panel as the substrate is shown in Figure 3.1.1:

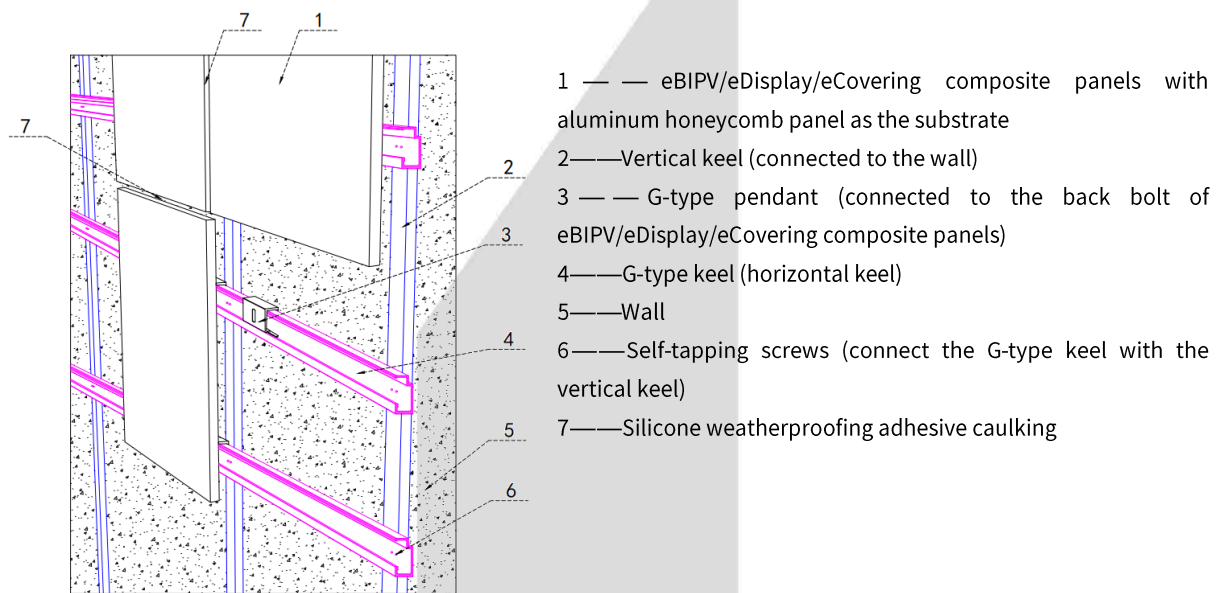


Figure 3.1.1 Perspective view of the installation diagram of eBIPV/eDisplay/eCovering composite panels with aluminum honeycomb panel as the substrate



3.1.2 The cross-section of the installation diagram of eBIPV/eDisplay/eCovering composite panels with aluminum honeycomb panel as the substrate is shown in Figure 3.1.2:

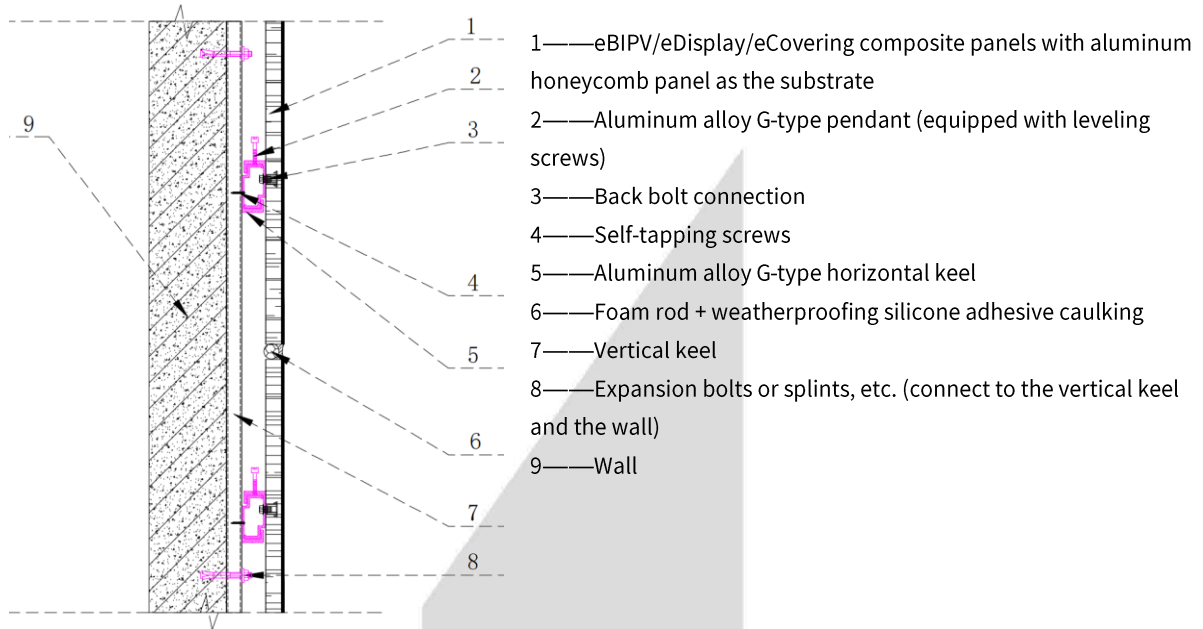


Figure 3.1.2 Cross-sectional view of the installation diagram of eBIPV/eDisplay/eCovering composite panels with aluminum honeycomb panel as the substrate

3.1.3 The schematic diagram of the back bolt of eBIPV/eDisplay/eCovering composite panels with aluminum honeycomb panel as the substrate is shown in Figure 3.1.3:

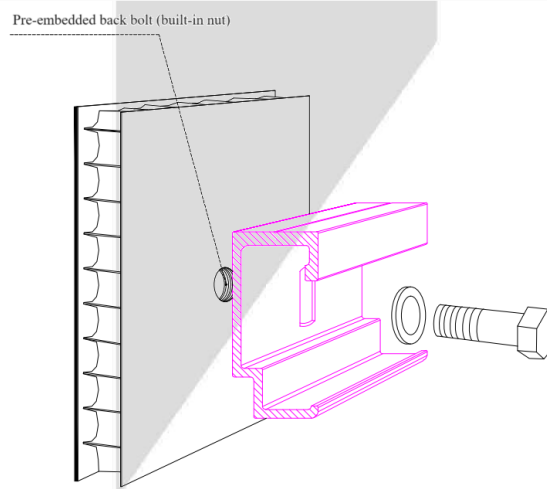


Figure 3.1.3 Schematic diagram of the back bolt of eBIPV/eDisplay/eCovering composite panels with aluminum honeycomb panel as the substrate

## 3.2 eBIPV/eDisplay/eCovering Composite Panels with Metal-Folded Veneers as Substrates

3.2.1 The installation diagram of eBIPV/eDisplay/eCovering composite panels with metal-folded veneers (such as aluminum veneer) as the substrate is shown in Figure 3.2.1:

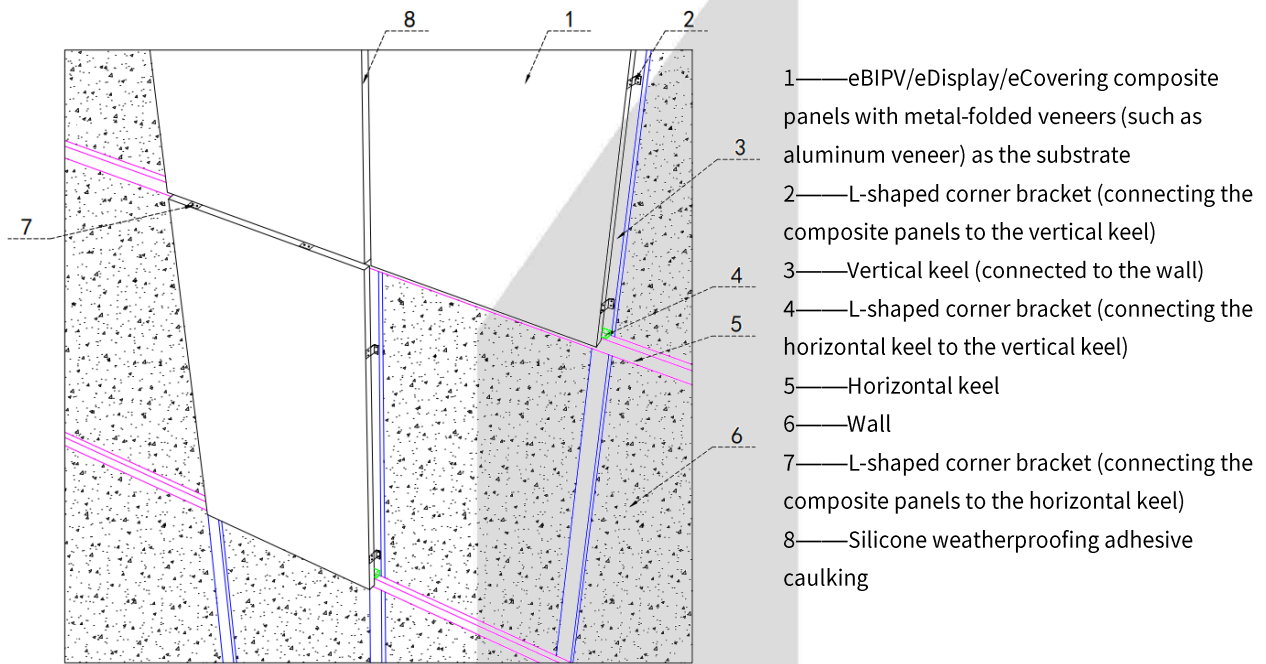


Figure 3.2.1: Perspective view of the installation diagram of eBIPV/eDisplay/eCovering composite panels with metal-folded veneers (such as aluminum veneer) as the substrate

3.2.2 The cross-section of the installation diagram of eBIPV/eDisplay/eCovering composite panels with metal-folded veneers (such as aluminum veneer) as the substrate is shown in Figure 3.2.2:

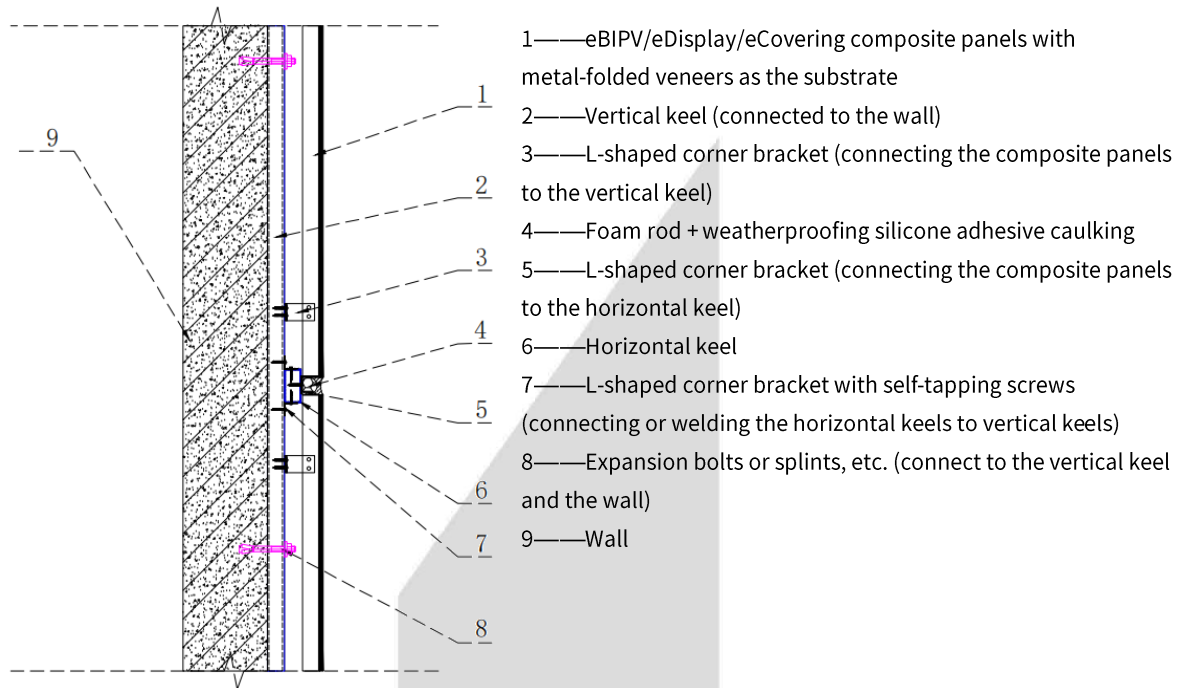


Figure 3.2.2: Cross-sectional view of the installation diagram of eBIPV/eDisplay/eCovering composite panels with metal-folded veneers (such as aluminum veneer) as the substrate

### 3.3 eBIPV/eDisplay/eCovering Composite Panels with Metal-Faced Rockwool Sandwich Plates as the Substrate

3.3.1 The installation diagram of eBIPV/eDisplay/eCovering composite panels with metal-faced rockwool sandwich Plates as the substrate is shown in Figure 3.3.1:

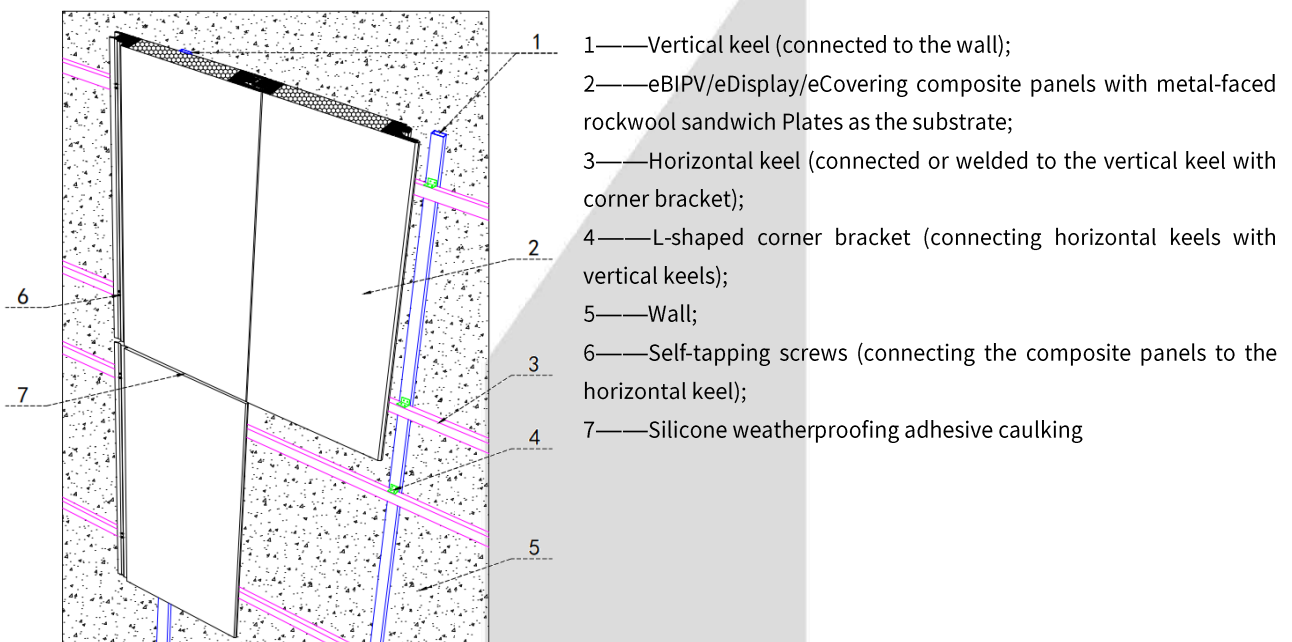


Figure 3.3.1: Perspective view of the installation diagram of eBIPV/eDisplay/eCovering composite panels with metal-faced rockwool sandwich Plates as the substrate

3.3.2 The (side-view) cross-section of the installation diagram of eBIPV/eDisplay/eCovering composite panels with metal-faced rockwool sandwich Plates as the substrate is shown in Figure 3.3.2:

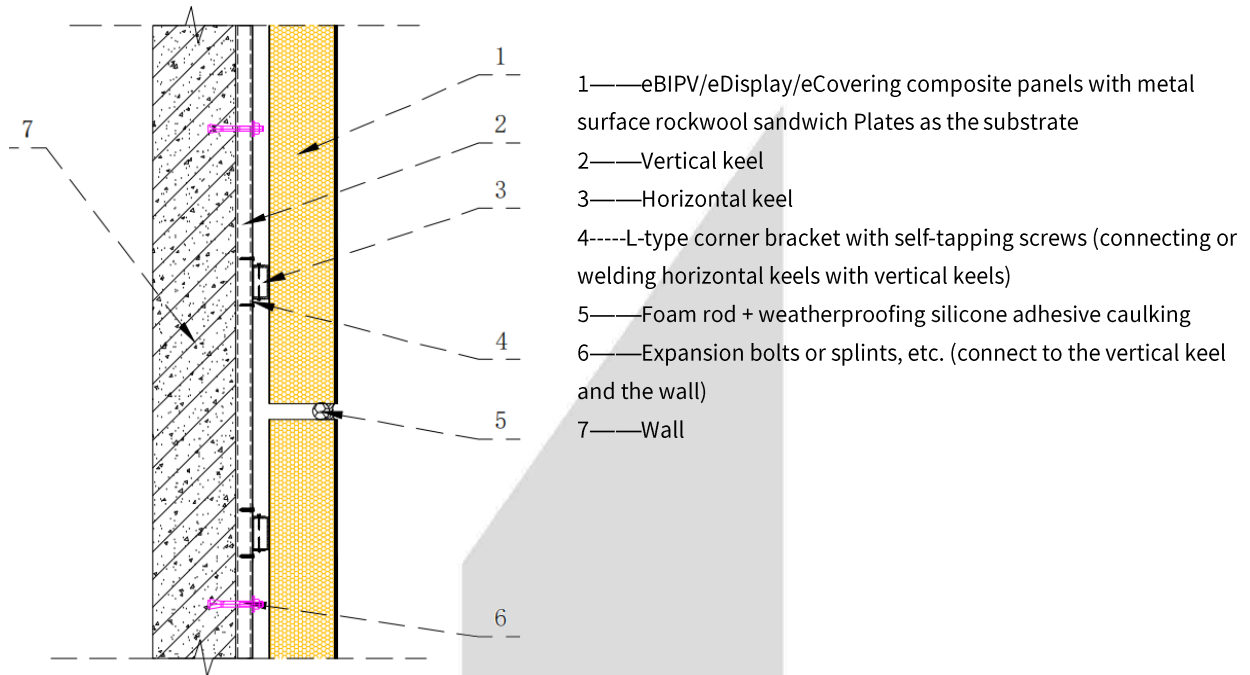
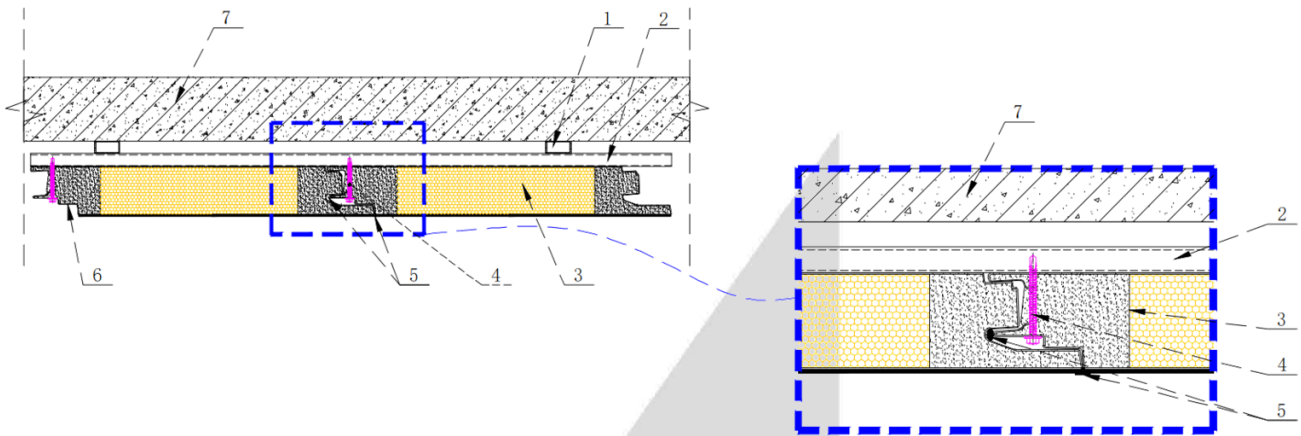


Figure 3.3.2 Cross-sectional (side-view) of the installation diagram of eBIPV/eDisplay/eCovering composite panels with metal-faced rockwool sandwich plates as the substrate

3.3.3 The cross-section (top-view) of the installation diagram of eBIPV/eDisplay/eCovering composite panels with metal-faced rockwool sandwich Plates as the substrate (vertical row) is shown in Figure 3.3.3:



- 1—Vertical keel
- 2—Horizontal keel
- 3—eBIPV/eDisplay/eCovering composite panels with metal-faced rockwool sandwich Plates as the substrate
- 4—Self-tapping screws
- 5—weatherproofing silicone adhesive
- 6—Groove and tongue exposed
- 7—Wall

Figure 3.3.3 The cross-section (top-view) of the installation diagram of eBIPV/eDisplay/eCovering composite panels with metal-faced rockwool sandwich Plates as the substrate (vertical row)

### 3.4 Design of eBIPV/eDisplay/eCovering Composite Panels for Curtain Walls and Zero Carbon Surfaces: the combination application

#### 3.4.1 General principles of design:

1. eBIPV composite panels and eDisplay composite panels can only be installed by dry-hanging, while the eCovering composite panels can be installed by either wet-adhered or dry-hanging. Leverage these characteristics to create a consistent appearance (texture, pattern, color) across the entire building and to fully ensure the aesthetics, functionality and economic benefit of the building facades;

2. Fully reflect the functionality of the curtain wall, especially the power generation function of the eBIPV, to meet the design standards and relevant government provisions and requirements;

3. Minimize the cost as much as possible - if installation conditions allowed, wet-adhered is preferred over dry hanging; standard panels are favored over non-standard panels; when the standard panel area of a continuous facade accounts for less than 50%, it is not recommended to use eBIPV or eDisplay.

4. For the installation of the keels in eBIPV/eDisplay curtain wall systems, it is essential to reserve the necessary space on the back of the panels to accommodate electrical wiring. Typically, the surface of the horizontal and vertical keels should not be aligned on the same plane. This means that the secondary keel should be installed in an intersecting manner across the primary keel. This configuration ensures proper spatial allocation for the wiring and enhances structural integrity. It is a crucial consideration for maintaining both the aesthetic and functional aspects of the curtain wall system.

#### 3.4.2 Specifications and dimensions of eBIPV/eDisplay/eCovering composite panels:

1. The standard panel size of the eBIPV is: 600mm×1200mm; only standard panels can be used for eBIPV;

2. The standard panel size of the eDisplay is: 600mm×1200mm. The minimum module size of the eDisplay is 100mm×200mm. Each eDisplay can offer either full panel display or partial panel display. The display range is a multiple of 100mm×200mm and is rectangular. The display and non-display areas are made to have the same appearance when not lit.



3. The standard panel size of the eCovering is: 600mm×1200mm; non-standard (ustom) panels can be used; the length is no more than 1200mm, and the width is no more than 600mm;

4. To optimize the design, it is important to minimize the specifications and the quantity of non-standard panels. Otherwise, it will lead to an elevated cost (panel prices, packaging, transportation, keel and auxiliary materials, and labor costs) and an extended project timeline;

5. The specifications of eCovering panels vary according to different types, and any design should be made via consulting and communication with the product supplier. The cutting and wet-adhered of eCovering panels are relatively more convenient and are not subject to the above-mentioned rules. However, under the premise of ensuring the aesthetic requirements of the design, and from the perspective of production, transportation, installation, etc., the quantity of specifications should still be reduced as much as possible.

### 3.4.3 The selection of materials and installation methods for different façade situations:

1. eBIPV: dry hanging installation should be adopted for eBIPV in the locations where suitable, such as item 5 in Figure 3.4.3-1 and item 1 in Figure 3.4.3-2;

2. On the same continuous facade of eBIPV, where eBIPV cannot or does not need to be used (such as shading or custom-sized areas), standard or non-standard panels of eCovering can be used with dry hanging installation, such as item 6 in Figure 3.4.3-1 and item 2 & 3 in Figure 3.4.3-2;

3. For shading areas or non-standard size areas where eBIPV is not applicable, eCovering composite panels can be dry-hung or wet-adhered. See Figure 3.4.3-1 item 7 and Figure 3.4.3-2 item 2 & 3;

4. Specific Areas: For areas like window walls, inter-story walls, decorative (structural) columns, decorative (structural) beams, decorative lines, or other regions where eBIPV is not suitable, and the substrate is solid and flat, use wet-adhesion for eCovering. See Figures 3.4.3-1 item 7 and 3.4.3-2 item 4.

5. Joint Treatment: Ensure that the joints between wet-adhesion and dry-hanging areas are treated the same as adjacent dry-hanging areas, with consistent joint width and filler material, or in accordance with the design. See Figure 3.4.3-1 item 8.



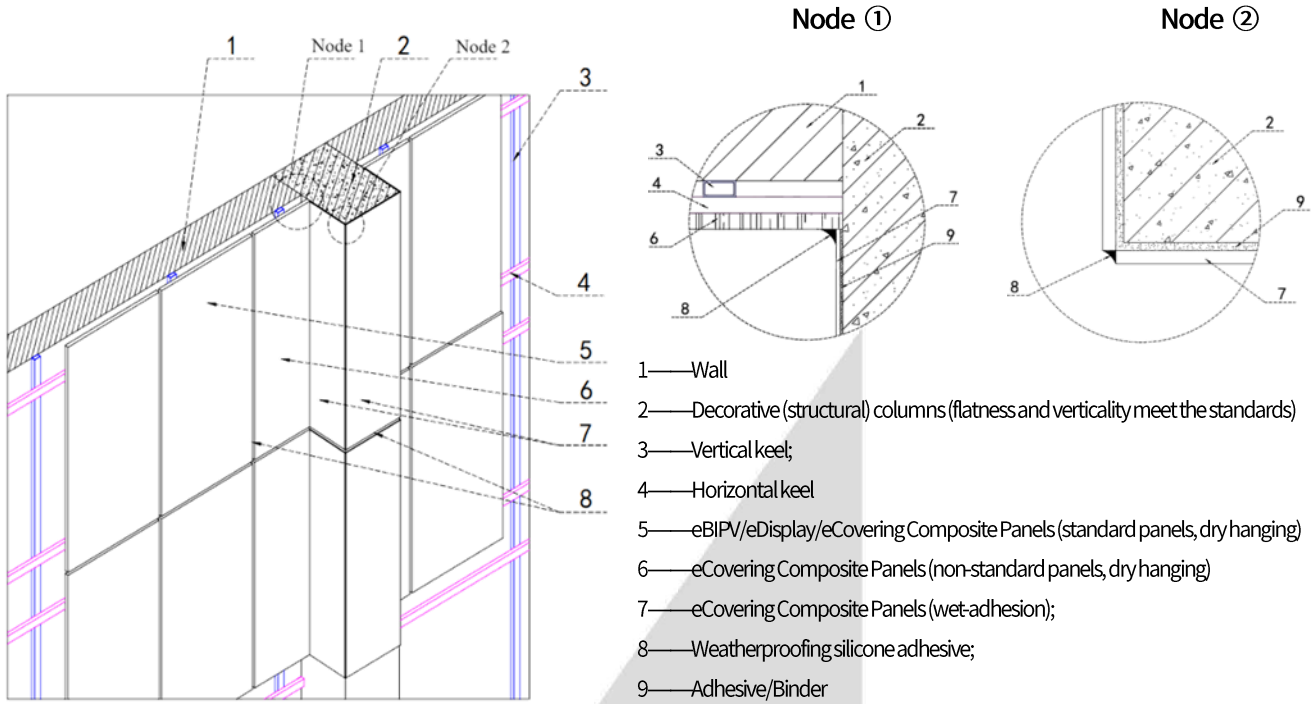


Figure 3.4.3-1 Schematic diagram of the installation locations of eBIPV/eDisplay/eCovering Composite Panels in curtain wall or façade applications



- 1—eBIPV/eDisplay Composite Panels (standard panels, dry hanging)
- 2—eCovering Composite Panels (shading area below the dotted line, standard panels, dry hanging)
- 3—eCovering Composite Panels (non-standard panels, dry hanging)
- 4—econiclay (wall, wet-adhesion)
- 5—econiclay (floor, wet-adhesion)

Figure 3.4.3-2 Real-life examples of eBIPV/eDisplay/eCovering Composite Panels and econiclay in different application areas

## 4 Installation and Construction

### 4.1 General Guidelines

4.1.1 The installation and construction of eBIPV/eDisplay/eCovering composite panels for curtain walls should be carried out only after the completion and acceptance of the main structural works.

4.1.2 The material variety, specification, color and performance of curtain wall components and accessories should meet the design requirements.

4.1.3 The installation of curtain walls must be prepared with a construction organization design, which should include the following contents:

1. Project schedule;
2. Safety measures;
3. Handling and lifting methods;
4. Methods of measurement;
5. Installation procedures;
6. Installation order and steps;
7. Inspection and acceptance protocols;

## 4.2 Preparation for Installation

4.2.1 During transportation, handling, and lifting, components must be protected from collisions, damage, and contamination.

4.2.2 During storage, components should be arranged in the order of installation, and the racks should have sufficient load-bearing capacity and rigidity. Protective measures should be taken when storing outdoors.

4.2.3 The manufacturing certificate should be checked before installing any component, and unqualified components (including certificate missing) must not be installed.

4.2.4 The embedded parts for connecting the curtain wall to the main structure should be installed according to the design requirements during the construction of the main structure. The embedded parts should be secure and accurately positioned, and the positional errors of the embedded parts should be reviewed according to the design requirements. When there is no clear requirement in the design, the elevation deviation of the embedded parts should not be greater than 10mm, and the positional difference of the embedded parts should not be greater than 20mm.

## 4.3 Installation of Curtain Walls

4.3.1 The measurements of installation should be coordinated with the measurements of the main structure, and any errors should be adjusted in time.

4.3.2 The installation of curtain wall columns shall comply with the following provisions:

1. The elevation deviation of the column installation should not be greater than **3mm**, the front-to-back deviation of the axis should not be greater than **2mm**, and the left-to-right deviation should not be greater than **3mm**;

2. The elevation deviation between two adjacent columns should not be greater than **3mm**, the maximum elevation deviation of columns on the same floor should not be greater than **5mm**, and the distance deviation between two adjacent columns should not be greater than **2mm**.

4.3.3 The installation of curtain wall beams shall comply with the following provisions:

1. The connectors and shims at both ends of the beam should be securely installed at the predetermined positions of the columns with tight joints;

2. The horizontal elevation deviation between two adjacent beams should not be greater than **1mm**. Elevation deviation on the same floor: when the width of a curtain wall is less than or equal to **35m**, it should not be greater than **5mm**; when the width of a curtain wall is greater than **35m**, it should not be greater than **7mm**.

4.3.4 The installation of eBIPV/eDisplay/eCovering composite panels for curtain walls shall comply with the following regulations:

1. Inspect, measure and adjust the horizontal and vertical connectors;

2. When installing the curtain wall, the horizontal and vertical deviations should not be greater than **1.5mm**;

3. The empty seams at joints should have waterproof measures in place with drainage outlets that meet the design requirements;

4. When filling with silicone weatherproofing sealant, the width and thickness of the seams should be determined after calculation based on the technical parameters of the sealant.

4.3.5 After welding any steel component for the curtain wall, effective anti-corrosion measures should be applied to the metal surface.

4.3.6 The allowable assembly deviations of the vertical and horizontal panels for the curtain walls shall comply with the requirements as specified in Table 4.3.6.

Table 4.3.6 Allowable deviations of vertical and horizontal panels for curtain walls (unit: mm)

Project	Size range	Tolerance	Inspection Method
Distance between two adjacent vertical panels (fixed end)	—	±2.0	Steel tape
Two adjacent panels	—	±1.5	Ruler
The distance between two adjacent horizontal panels	When the spacing is less than or equal to 2000	±1.5	Steel tape
	When the spacing is greater than 2000	±2.0	
Diagonal difference	When the diagonal length is less than or equal to 2000	≤3.0	Steel tape or telescopic ruler
	When the diagonal length is greater than 2000	≤3.5	
Horizontal elevation of two adjacent transverse panels	—	≤2	Steel ruler or spirit level
Levelness of horizontal panels	When the length of the component is less than or equal to 2000	≤2	Level or spirit level
	When the component length is greater than 2000	≤3	
Straightness of vertical panels	—	2.5	2.0m ruler, steel ruler
The angle with respect to the horizontal plane of the connecting support under the panel is allowed to tilt upwards/not allowed to tilt downwards	—	+2.0 degrees/0	Plug gauge
The angle with respect to the horizontal plane of the connecting support above the panel is only allowed to tilt downward	—	0/-2.0 degrees	—

4.3.7 The allowable deviation of curtain wall installation shall comply with the requirements as specified in Table 7.3.7.

Table 4.3.7 Permissible deviation of curtain wall installation

Project		Allowable deviation (mm)	Inspection Method
Vertical seams and Wall verticality	Curtain wall height (H) (m)	$\leq 10$	Laser theodolite or theodolite
	$H \leq 30$		
	$60 \leq H < 30$	$\leq 15$	
	$90 \leq H < 60$	$\leq 20$	
	$H > 90$	$\leq 25$	
Curtain wall flatness		$\leq 2.5$	2m ruler, steel ruler
Vertical seam straightness		$\leq 2.5$	2m ruler, steel ruler
Horizontal seam straightness		$\leq 2.5$	2m ruler, steel ruler
Seam width (compared with design value)		$\pm 2$	Caliper
The height difference between the seams of two adjacent panels		$\leq 1.0$	Depth Gauges

4.3.8 In addition to the requirements of Table 4.3.7, the allowable deviation of unit curtain wall installation shall also comply with the requirements as specified in Table 4.3.8.

Table 4.3.8 Permissible deviation of unit curtain wall installation (mm)

project		Tolerance	Inspection Method
Elevation of unit components on the same floor	Width less than or equal to 35m	$\leq 3.0$	Laser theodolite or theodolite
The height difference between the two adjacent component panels		$\leq 1.0$	Depth Gauges
Overlap length of two components to the plug-in joint (compared with the design value)		$\pm 1.0$	Caliper
Between two components and the bottom of the slot (compared with the design value)		$\pm 1.0$	Card ruler

4.3.9 During the curtain wall installation, it is advised to conduct rainwater leakage inspection at the joints.

4.3.10 The curtain wall installation and construction shall be subject to acceptance of the following items:

1. Installation and anti-corrosion treatment of the connection nodes between the main structure and columns, and between columns and beams;
2. Fireproofing and thermal insulation installation of curtain walls;
3. Installation of expansion joints, settlement joints, seismic joints and corners of curtain walls;
4. Installation of lightning protection nodes of curtain wall;
5. Installation of sealants for the curtain wall.

## 4.4 Protection and Cleaning of Curtain Walls

4.4.1 Protective measures must be implemented to prevent any distortion, deformation, discoloration, or contamination of the curtain wall components and panels.

4.4.2 Adhesives and residues on the curtain wall surface should be promptly removed during construction.

4.4.3 After the completion of curtain wall installation, a cleaning plan should be formulated to avoid surface damage during cleaning.

4.4.4 Cleaning agents for the curtain wall should meet the requirements and should not cause corrosion and pollution.

## 4.5 Installation Safety

4.5.1 In addition to the current industry standard "Technical Specifications for Construction Safety at high elevations" (JGJ80), the safety measures for curtain wall installation should also comply with the requirements determined by the construction organization's design.

4.5.2 Construction machinery and hoists used for curtain wall installation should be strictly inspected before use and can only be used if they meet safety standards.

4.5.3 Construction workers must wear safety helmets, secure safety belts, and carry tool bags while performing tasks.

4.5.4 When there are cross-level operations in the project, lower levels should enforce reliable safety protection measures.

4.5.5 Fire prevention measures should be in place beneath welding areas during on-site welding operations.

4.5.6 Scaffolding must be kept clear of debris, and construction tools are prohibited from being placed on window sills or railings.



## 4.6 Installation of electrical parts of eBIPV Curtain Walls

The electrical installation of eBIPV should be carried out simultaneously with the curtain wall installation, following the specific electrical design drawings and construction standards of the electrical engineering.

4.6.1 eBIPV power generation system (off-grid) is illustrated in Figure 4.6-1:

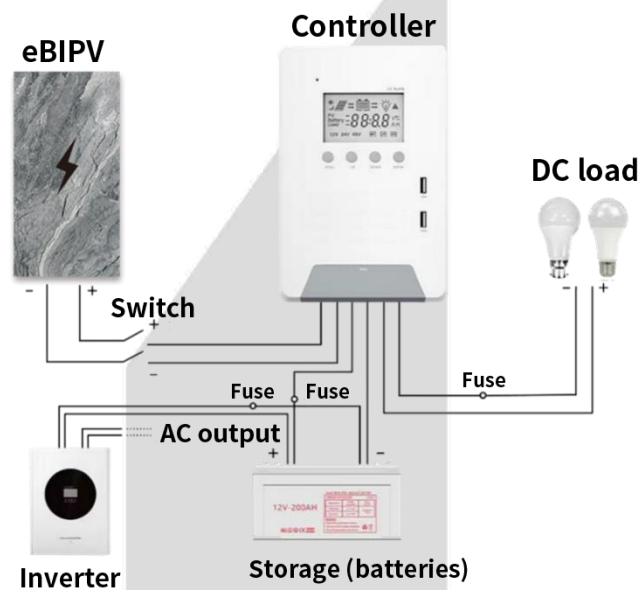


Figure 4.6.1 Schematic diagram of eBIPV power generation system (off-grid)

4.6.2 The eBIPV power generation system (grid-connected) is shown in Figure 4.6.2:

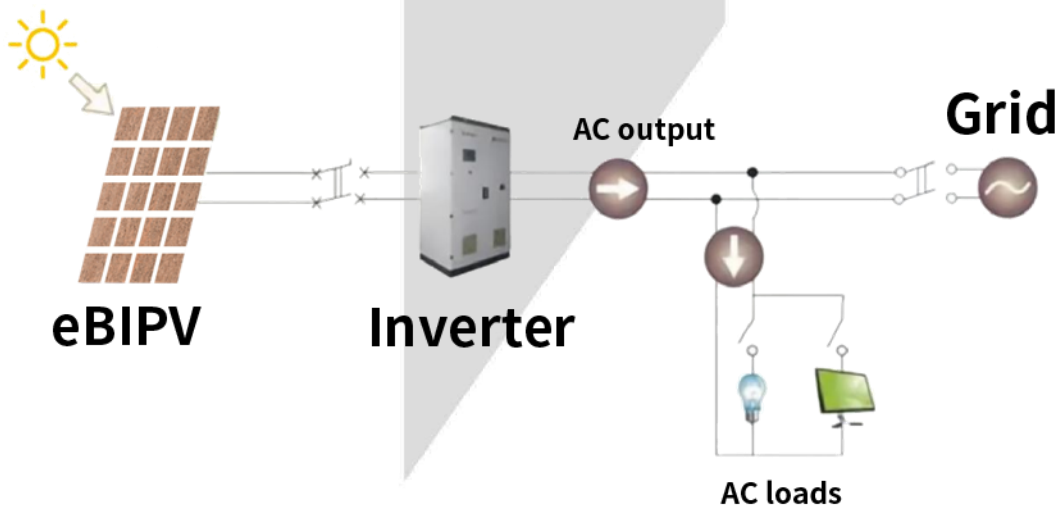


Figure 4.6.2 Schematic diagram of eBIPV power generation system (grid-connected)

## 5 Standards of Project Acceptance

5.0.1 The surface of the curtain wall project should be wiped clean before acceptance inspection.

5.0.2 The following documents should be submitted for acceptance of curtain wall projects:

1. Design drawings, calculation, files related to design modifications;
2. Certificates of quality for materials, components, and parts, as well as reports on silicone structural adhesive compatibility tests and physical performance tests of the curtain wall.
3. Physical performance test report of eBIPV/eDisplay composite panels;
4. Physical performance test report of eCovering composite panels;
5. Acceptance documents for concealed works;
6. Installation self-inspection records;
7. Quality certificates of prefabricated components;
8. Other quality assurance information.

5.0.3 The visual inspection of curtain wall projects shall comply with the following guidelines:

1. The exposed frames of the curtain wall should be level and plumb, conforming to the design requirements.;
2. The caulking joints of the curtain wall should be level and plumb, with a smooth and uncontaminated surface;
3. The color of the panels should be uniform, with a permissible color difference of one grade compared to the same color panels. Differences in color due to natural variations inherent in the imitated materials should not be considered color differences;
4. The texture of the panels should match the reference panel, and the pattern should meet the design requirements. Differences in texture and pattern due to natural variations inherent in the imitated materials should not be considered inconsistencies;
5. The treatment of settlement joints, expansion joints and seismic joints should maintain the consistency of appearance and meet the design requirements;

6. The surface of the panels should be flat, with no noticeable deformations, ripples, or localized depressions when observed from 3m away. Inherent irregularities such as bumps, ripples, or indentations in the product's texture are not considered defects;

7. The panel surface should be free from artificially induced damage such as dents, corners, cracks, or stains.

5.0.4 The sampling inspection of curtain walls shall comply with the following guidelines:

1. Leakage tests should be conducted by sampling one location per 100m<sup>2</sup> of curtain wall area, with water testing performed in areas prone to rain leakage, such as inside and outside corners;

2. The surface quality of each square meter of panel should comply with the provisions as specified in Table 5.0.4-1;

Table 5.0.4-1 Surface quality of panels (per m<sup>2</sup>)

Project	Quality requirements
0.1-0.3mm wide scratch	Length less than 100mm, no more than 8
Abrasions	No more than 500mm <sup>2</sup>

Note: 1. Scratches are those where the pattern of the panel is damaged; 2. Abrasions are those where the pattern of the panel is blurred.

3. The surface quality of each single panel should comply with the requirements as specified in Table 5.0.4-2;

Table 5.0.4-2 Surface quality of each single panel

Project	Quality requirements
0.1~0.3mm scratch	Length less than 100mm, no more than 2
Abrasions	No more than 500m <sup>2</sup>

Note: 1. Damage to the pattern of the plate is a scratch; 2. Blurred pattern of the plate is an abrasion.

4. The installation quality of the panels shall comply with the provisions of Table 5.0.4-3;

Table 5.0.4-3 Installation quality of panels

Item		Allowable deviation (mm)	Inspection Method
Vertical seams and Vertical seams on wall	Curtain wall height less than 3m	$\leq 2$	Laser theodolite or theodolite
	Curtain wall height greater than 3m	$\leq 3$	
Curtain wall levelness (story height)		$\leq 2$	2m ruler, steel ruler
Vertical seam straightness (story height)		$\leq 2$	2m ruler, steel ruler
Horizontal seam straightness (story height)		$\leq 2$	2m regular ruler, steel ruler
Joint width (compared with design value)		$\leq 1$	Caliper

5. The installation quality of the curtain walls shall comply with the requirements of Table 5.0.4-4;

Table 5.0.4- 4 Quality of curtain wall installation

item	Order	Allowable deviation (mm)	Inspection Method
Curtain wall verticality	Curtain wall height less than 30m	$\leq 10$	Laser theodolite or theodolite
	Curtain wall height greater than 30m but less than 60m	$\leq 15$	
	Curtain wall height greater than 60m but less than 90m	$\leq 20$	
	Curtain wall height greater than 90m	$\leq 25$	
Vertical panel straightness		$\leq 3$	2m ruler, Feeler gauge
The horizontality of the horizontal panel less than 2000mm		$\leq 2$	Spirit level
Elevation difference between two adjacent transverse compents at the same height		$\leq 1$	Steel Ruler, Feeler Gauge
Curtain wall horizontal level	Floor height less than 3m	$\leq 3$	Spirit level
	Floor height greater than 3m	$\leq 5$	
Diagonal difference of grid frame	Diagonal length less than 2000mm	$\leq 3$	3m steel tape
	Diagonal length greater than 2000mm	$\leq 3.5$	

5.0.5 The number of sampling inspections for curtain wall projects shall be implemented in accordance with the relevant provisions of the current industry standard "Technical Specifications for Glass Curtain Wall Projects" (JGJ102) .

## 6 Maintenance and repair

6.0.1 Following the acceptance of a curtain wall project, it's essential to establish a plan and system for its ongoing maintenance and repair for ensuring regular upkeep.

6.0.2 Cleaning frequency for the curtain wall should be determined by the extent of surface pollution, with at least one annual cleaning session recommended.

6.0.3 Routine inspections of the curtain walls, at five-year intervals during standard use, should cover components like panels, sealing strips, sealants, and silicone structural elements.

6.0.4 Inspection and maintenance of curtain walls shall be carried out in accordance with the following protocols:

1. Prompt tightening of loosened bolts and addressing rusted connectors through rustproofing or replacement.

2. Swift repairment or replacement of any loose or damaged panels;

3. Timely repairment or replacement of loose or damaged sealants or sealing strips.;

4. Immediate replacement of damaged curtain wall components or connectors, with reinforcement or repairment of anchorages if loosened or detached;

5. Regular checks of the curtain wall drainage system, with prompt clearance of any blockages;

6. Replacement and repairment of any loose, damaged, or malfunctioning hardware components;

7. After natural disasters such as typhoons, earthquakes, or fires, conduct a comprehensive inspection of the curtain wall and perform repairs or reinforcement depending on the extent of the damage.

6.0.5 Safety regulations during maintenance and repair operations:

1. Inspection, maintenance and repair work on the outside of the curtain wall shall not be carried out in wind speeds exceeding level 4 or in heavy rain conditions;

2. When inspecting, cleaning, maintaining and repairing curtain walls, the machines and equipment used must be easy to operate, safe and reliable:

3. During the maintenance and repair of curtain walls, all workers working at high elevations must comply with the relevant provisions of the current industry standard "Technical Specifications for Safety of Working at high elevations in Construction" (JGJ80) .